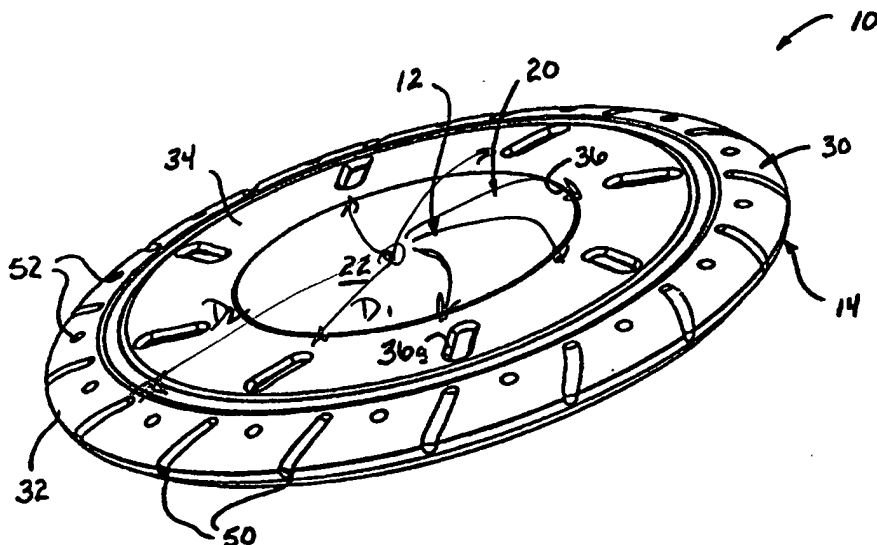


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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: FLYING DISC TOY



## (57) Abstract

A toy (10) for throwing and capture by one or more players is provided, such toy including a rigid flight plate (20), and a resilient edge cushion (30) secured to the perimeter of the flight plate to facilitate catching of the toy. The flight plate preferably is formed of a transparent material generally in the shape of a disc having a central portion bounded by an outer perimeter. The edge cushion typically is co-molded with the flight plate extending radially and downwardly therefrom to define a resilient rim. The edge cushion is formed from an opaque material, defining one or more openings which frame windows in the toy so as to provide a unique visual effect.

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## FLYING DISC TOY

### Technical Field

The present invention relates generally to recreational devices, and more particularly, to a toy which may be thrown and caught. More particularly still, the invention  
5 concerns a flying disc including a rigid flight plate at least partially covered by a resilient cushion which facilitates throwing and capture of the toy.

### Background Art

For many years now, discs have been used as throwing and catching toys, both for recreational purposes and in competition sports. With a flick of the wrist, an individual may impart  
10 a spin which enhances the disc's aerodynamic characteristics, sending the disc flying through the air to a distant player who will attempt to catch the disc while it is still in flight. Catching is made difficult, however, due to the aerodynamic shape of such discs, and to the relatively stiff or hard materials from which the discs are made. For example, an individual may experience problems due to the unyielding gripping surface which results from use of stiff or hard construction materials.  
15 These problems are particularly apparent in competitions, where players employ complicated throwing and catching maneuvers, often at speeds which make the disc even more difficult to catch. In fact, a player may actually experience pain when catching a disc traveling at high speed.

One potential solution to the aforementioned problems may be to form the disc using of a more resilient material, perhaps by molding the disc from a light-weight foam. This  
20 solution, however, may compromise the disc's structural integrity, and could negatively affect the flight characteristics of the toy. Another possible solution may be to fit a conventional flying disc toy with a thin, grip-enhancing skin. Unfortunately, such an arrangement fails to adequately address problems associated with impact of the disc, particularly where the disc is traveling at a high speed.

What is needed is a flying disc toy which employs a resilient edge cushion which will facilitate capture without compromising structural integrity of the toy.

### Disclosure of the Invention

The present invention involves a toy for throwing and capture by one or more  
5 players, the toy including a rigid flight plate and a resilient edge cushion secured to the perimeter of the flight plate to facilitate catching of the toy. The flight plate preferably is formed of a transparent material, generally in the shape of a disc having a central portion bounded by an annular portion with an outer perimeter designed to secure the edge cushion to the flight plate. The edge cushion typically is co-molded with the flight plate, extending radially and downwardly therefrom to define  
10 a resilient rim. In the preferred embodiment, the edge cushion is formed from an opaque material, defining one or more openings which frame windows in the toy so as to provide a unique visual effect. The flight plate thus provides the toy with structural integrity, and the edge cushion provides the toy with enhanced grippability and visual effect.

These and additional objects and advantages of the present invention will be more  
15 readily understood after a consideration of the drawings and the detailed description of the preferred embodiment.

### Brief Description of the Drawings

Fig. 1 is an isometric view of a flying disc toy constructed in accordance with a preferred embodiment of the invention.

20 Fig. 2 is a top plan view of the flying disc toy shown in Fig. 1.

Fig. 3 is a bottom plan view of the flying disc toy shown in Fig. 1.

Fig. 4 is a side view of the flying disc toy shown in Fig. 1.

Fig. 5 is an isometric view of a flight plate which forms a part of the flying disc toy shown in Fig. 1.

Fig. 6 is a cross-sectional view of the flying disc toy shown in Fig. 1, the view being taken generally along lines 6-6 of Fig. 3.

Fig. 7 is a fragmentary cross-sectional view depicting a toy constructed according to a first alternative embodiment of the invention.

5 Fig. 8 is a fragmentary cross-sectional view depicting a toy constructed according to a second alternative embodiment of the invention.

Fig. 9 is a fragmentary cross-sectional view depicting a toy constructed according to a third alternative embodiment of the invention.

Fig. 9A is an enlarged fragmentary cross-sectional view of a flight plate used in the  
10 flying disc toy of Fig. 9.

#### Detailed Description of the Preferred Embodiments and

#### Best Mode for Carrying Out the Invention

Referring initially to Figs. 1 through 6, it is to be noted that a preferred embodiment of the invented toy is shown at 10, such toy taking the form of a flying disc having a somewhat  
15 planar central portion 12 surrounded by a downwardly depending rim portion 14. The central portion acts in concert with the rim portion to provide an aerodynamic support structure, with the rim portion further providing a handhold which may be used by individuals when throwing or catching the disc. As will be appreciated upon reading further, the central portion is substantially rigid. The rim portion, however, is resilient so as to provide the toy with a cushioned grip. In this  
20 manner, the toy is given a structural integrity which is sufficient to accommodate high performance use, while still providing the toy with enhanced grippability features.

The depicted toy has been constructed using a framework in the form of a rigid flight plate 20. As indicated in Figs. 5 and 6, the flight plate includes a raised center portion 22, an annular portion 24, and an outer perimeter 26. In this embodiment, center portion 22 is raised only

slightly relative to annular portion 24, typically on the order of approximately 1/16-inch. Outer perimeter 26 is defined by the terminus of annular portion 24, typically adjacent a webbed extension 24a. The flight plate also may be provided with a plurality of apertures 28.

As indicated, the flight plate is rigid, preferably being formed from a material such as polypropylene. Although some flexing of the flight plate may be possible (due to the fact that the flight plate is relatively thin) it is important is that the disc be sufficiently rigid to provide proper structural integrity to the disc. In the preferred embodiment, the flight plate also is transparent, thus allowing for construction of a toy with a unique visual effect as will be described below.

In accordance with the present invention, the depicted toy is provided with a resilient edge cushion 30 which is secured to the flight plate, typically by co-molding the edge cushion to the flight plate (a process wherein the rigid flight plate is placed within the edge cushion mold). The edge cushion at least partially covers the flight plate, extending radially and downwardly from the flight plate's outer perimeter so as to provide a multi-layered flying disc with improved gripping characteristics. Although the depicted toy is shown with the edge cushion covering only a perimeter portion of the flight plate's upper surface, those skilled will understand that the lower surface of the flight plate also may be covered. Similarly, the edge portion may be provided with various openings so as to expose various portions of the flight plate. What is important is that there is sufficient overlap to secure the edge portion to the flight plate.

As indicated above, the flight plate may be provided with various apertures, each of which may be filled with edge cushion material upon co-molding the edge cushion to the flight plate. Those skilled will understand that such interconnection of the flight plate and edge cushion will serve to strengthen the bond between the two components, and may decrease the weight of the toy. A lighter toy, in turn, will decrease the risk of injury, particularly where high speed maneuvers are employed.

The edge cushion is formed from a relatively resilient, opaque material which typically has a hardness within the range of between approximately 50 Shore A and 65 Shore A. Use of such a resilient material provides for enhanced grippability of the toy. Preferably, a polyethylene elastomere such as Engage™ (manufactured by Dow Chemical Co.) is employed.

5 The proposed material has a hardness of approximately 62 Shore A.

With reference to the drawings, edge cushion 30 will be seen to include a rim portion 32 and an annular portion 34, the annular portion of the edge cushion overlying the annular portion of the flight plate. The annular portion 34 defines a central opening 36. Because the edge cushion is opaque (and because the flight plate is transparent), opening 36 serves to frame a central  
10 window in the flying disc. Slot-shaped openings such as that shown at 36a also may be provided to frame corresponding slot-shaped windows in annular portion 34. These windows provide the toy with a unique visual effect.

As indicated in Figs. 1, 2 and 4, the edge cushion also may be provided with various surface contours which enhance the toy's flight characteristics and unique visual effect. It  
15 will be noted, for example, that the depicted disc has been provided with arcuate channels 50 which may serve to encourage spinning of the disc. The toy also is provided with indents such as that shown at 52, and an annular channel such as that shown at 54, both of which provide enhanced visual effect.

Referring now to Fig. 6, it will be noted that the toy's rim is defined substantially by  
20 edge cushion 30, providing the toy with a rim which is resilient so as to facilitate catching of the toy. In this embodiment, the flight plate is embedded a distance A in a disc which has an overall diameter B. Distance A preferably is approximately 1/4-inch for a disc having a distance B which is approximately 8 3/4-inches. The toy thus provides substantial cushion on impact against a player's hand.

In Fig. 7, a first alternative embodiment of the invented toy is illustrated in fragmentary cross-section, such toy taking the form of a flying disc indicated generally at 110. Like toy 10, disc 110 includes a central portion 112 and a rim portion 114, the central portion providing structural integrity to the disc by employing a rigid flight plate 120. Unlike the flight plate in toy 10, however, the flight plate in disc 110 does not extend to the rim portion of the disc. Instead, the outer perimeter 126 of the flight plate terminates within the central portion of the disc. Disc 110 thus employs an edge cushion 130 which entirely defines the rim portion, providing additional cushion upon impact. In this embodiment, such rim is approximately  $\frac{1}{2}$  -inch thick. Fig. 7 also illustrates a toy which is co-molded with the flight plate so as to cover portions of both the upper and lower surfaces thereof.

Fig. 8 shows another alternative embodiment of the invented toy, again in fragmentary cross-section. It will be appreciated that the toy takes the form of a flying disc which is indicated generally at 210. Like toy 10, disc 210 includes a central portion 212 and a rim portion 214. The central portion provides structural integrity to the disc by employing a rigid flight plate 220. However, the flight plate does not extend to the rim portion of the disc, but rather terminates in the outer perimeter 226 which is within the central portion of the disc. Disc 210 employs an edge cushion 230 which entirely defines the rim portion, providing a rim with substantial cushion upon impact. In this embodiment, such rim is approximately  $\frac{1}{2}$  -inch thick.

Yet another alternative embodiment is shown in Fig. 9, the invention once again taking the form of a flying disc (indicated generally at 310). Disc 310 will be seen to include a central portion 312 and a rim portion 314, the central portion being defined at least in part by a rigid flight plate 320. The rim portion is defined by a resilient edge cushion 330 which is secured to the flight plate, typically by co-molding the resilient cushion with the flight plate. The flight plate is defined by a center portion 322 and an annular portion 324, the annular portion terminating in a



raised outer lip 326 which helps to secure the edge cushion to the flight plate. It will be noted, for example, that the edge cushion includes an upper portion 332 which overlies the annular portion and outer lip of the flight plate, and also includes a lower portion 334 which underlies the outer lip of the flight plate. This typically is accomplished by co-molding the edge cushion with the flight plate. Furthermore, it will be noted that the flight plate does not extend into the rim portion of the disc, but rather terminates in the central portion of the disc. The rim portion thus is defined entirely by the edge cushion, providing a disc with substantial cushion on impact.

Fig. 9A shows the outer lip of the flight plate in detail, it being apparent that such lip gives the flight plate a generally Z-shaped cross-section near its perimeter. As indicated, the lip is raised a distance C, which distance typically corresponds to the thickness of the edge cushion below the lip. Furthermore, it will be noted that the lip has a length of approximately D. In the depicted embodiment distance C is approximately equal to the thickness of the flight plate. Distance D is approximately 1/8 inch. The lip tapers in a radial direction to accommodate stable attachment of the edge cushion to the flight plate.

Accordingly, while the preferred embodiment of the invention has been described, it will be appreciated that variations may be made without departing from the spirit and scope of the invention.

## WE CLAIM:

1. A toy for throwing and capture by one or more players, the toy comprising:  
a rigid, generally disc-shaped flight plate having a central portion bounded by an outer perimeter, the flight plate providing the toy with structural integrity; and  
a resilient, annular edge cushion secured to the perimeter of the flight plate to facilitate capture of the toy, the edge cushion being configured to provide the toy with a readily-gripable aerodynamic surface contour.
2. The toy of claim 1, wherein the flight plate is transparent.
3. The toy of claim 2, wherein the edge cushion is opaque.
4. The toy of claim 3, wherein the opaque edge cushion defines one or more openings, the edge cushion at least partially covering the central portion of the transparent flight plate to frame one or more windows.
5. The toy of claim 1, wherein the edge cushion extends radially beyond the outer perimeter of the flight plate and downwardly therefrom to define a resilient rim.

6. The toy of claim 1, wherein the edge cushion is molded about the perimeter of the flight plate.

7. The toy of claim 1, wherein the flight plate defines one or more recesses, the edge cushion being co-molded with the flight plate, the edge cushion being secured to the flight plate via introduction of the edge cushion into the recesses.

8. The toy of claim 1, wherein the edge cushion is formed from a material having a hardness of between 50 Shore A and 65 Shore A.

9. The toy of claim 1, wherein the edge cushion is formed of polyethylene.

10. A flying disc toy for throwing and capture by one or more players, the toy comprising:

a rigid flight plate having a transparent central portion bounded by an outer perimeter, the flight plate providing the toy with structural integrity; and

a resilient edge cushion co-molded with the flight plate from an opaque material, the edge cushion being disposed about the perimeter of the flight plate and extending radially therefrom to define a rim, the edge cushion thus being configured both to frame a central window and to provide the toy with a readily-gripable rim.

11. The flying disc toy of claim 10, wherein the flight plate defines one or more recesses, the edge cushion being secured to the flight plate at least partially via introduction of the edge cushion material into the recesses.

12. The toy of claim 10, wherein the edge cushion is formed from a material having a hardness of between approximately 50 Shore A and 65 Shore A.

13. The toy of claim 10, wherein the edge cushion is formed from a material having a hardness of approximately 62 Shore A.

14. The toy of claim 10, wherein the edge cushion is formed of polyethylene.
15. The toy of claim 10, wherein the edge cushion defines a plurality of slots, each overlying the flight plate to frame a corresponding window.
16. The toy of claim 10, wherein the edge cushion is molded with a surface contour which facilitates gripping of the toy.
17. The toy of claim 10, wherein the edge cushion is molded with a surface contour which includes aerodynamic grooves.

18. A flying disc toy for throwing and capture by one or more players, the toy comprising:

a rigid flight plate formed from a transparent material, the flight plate including a raised center portion and a recessed annular portion bounded by an outer perimeter, the flight plate providing the toy with structural integrity; and

a resilient edge cushion co-molded with the flight plate from an opaque material having a hardness of between approximately 50 Shore A and 65 Shore A, the edge cushion substantially covering the annular portion of the flight plate and extending radially therefrom to define a rim which facilitates capture of the toy, the edge cushion further defining a central opening which overlies the central portion of the flight plate to frame a central window.

19. The toy of claim 18, wherein the edge cushion further defines one or more slots which overlie the annular portion of the flight plate to frame one or more corresponding windows.

20. The toy of claim 18, wherein the edge cushion is molded with a surface contour which facilitates gripping of the toy.

21. A flying disc toy for throwing and capture by one or more players, the toy comprising:

a rigid flight plate formed from a transparent material, the flight plate including a raised center portion and a recessed annular portion bounded by a raised outer lip, the flight plate providing the toy with structural integrity; and

a resilient edge cushion co-molded with the flight plate from an opaque material, the edge cushion substantially covering the annular portion and lip of the flight plate, the underlying lip to secure the edge cushion to the flight plate, and extending radially from the lip to define a rim which facilitates capture of the toy, the edge cushion further defining a central opening which overlies the annular portion of the flight plate to frame a central window.

22. The toy of claim 1, wherein the edge cushion further defines one or more slots which overlie the annular portion of the flight plate to frame one or more corresponding windows.

23. The toy of claim 1, wherein the edge cushion is molded with a surface contour which facilitates gripping of the toy.

24. The toy of claim 1, wherein the edge cushion is formed from a material having a hardness of between 50 Shore A and 65 Shore A.

25. The toy of claim 1, wherein the edge cushion is formed of polyethylene.



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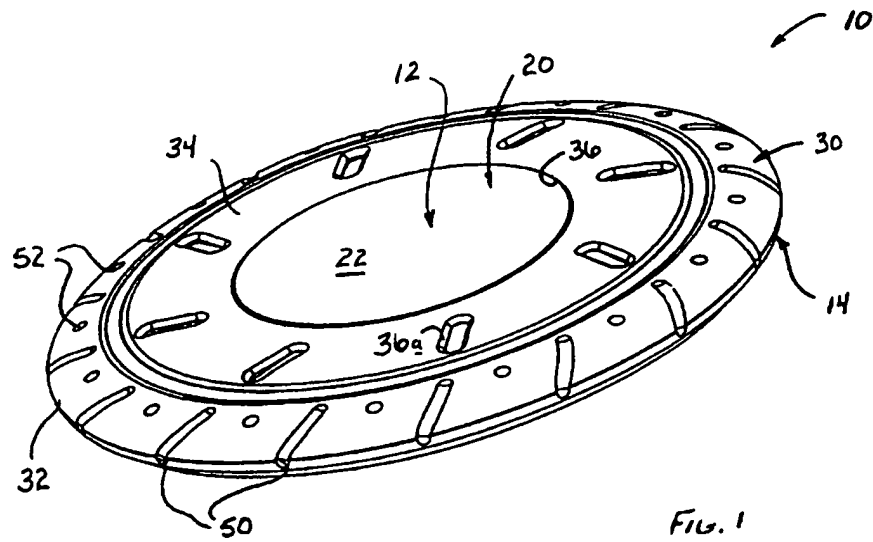


FIG. 1

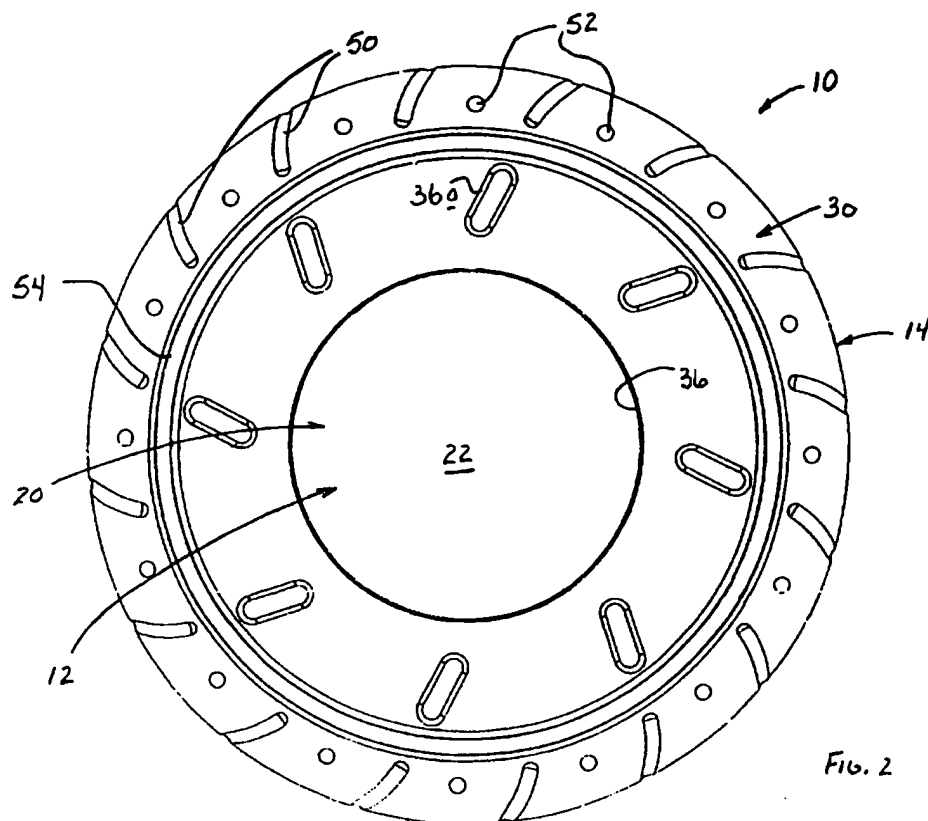


FIG. 2

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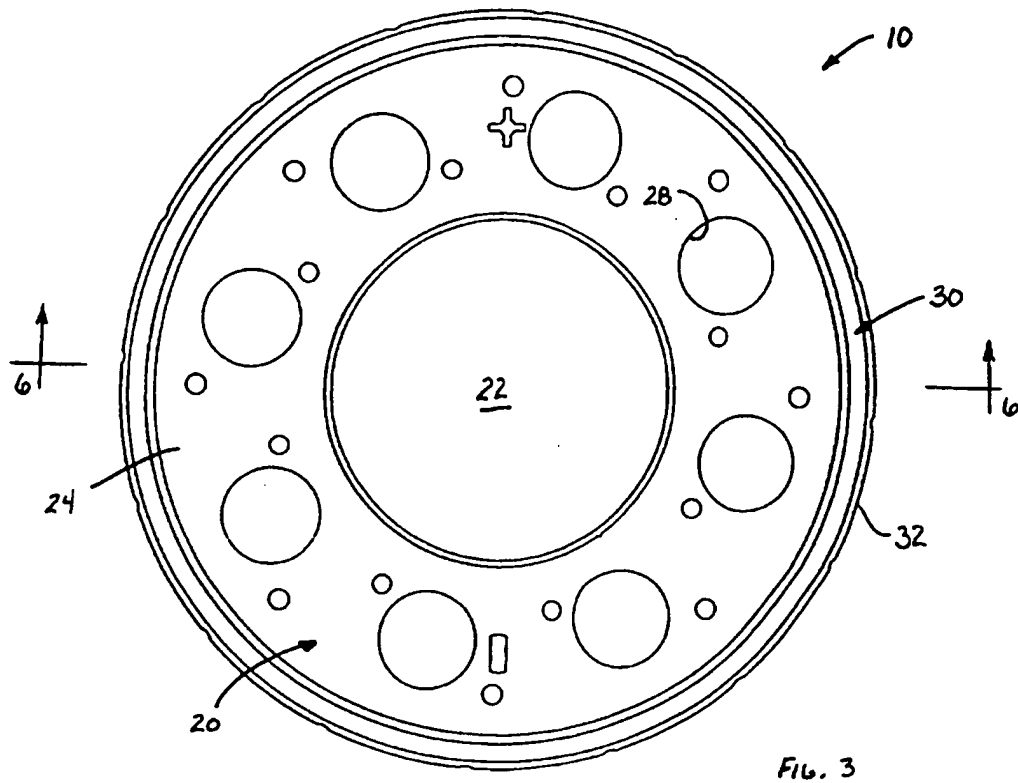


FIG. 3

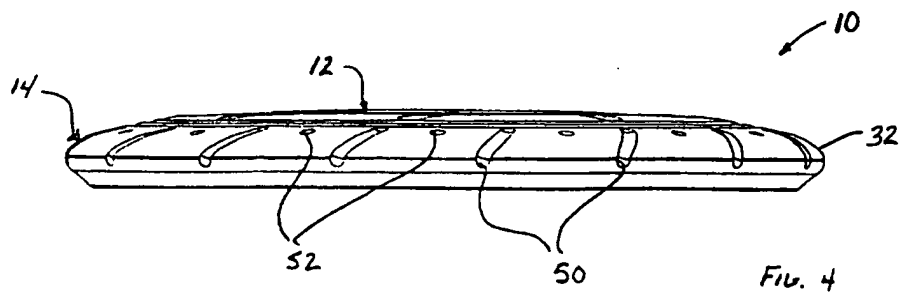
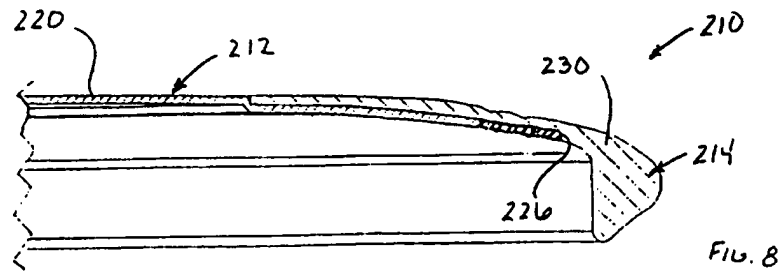
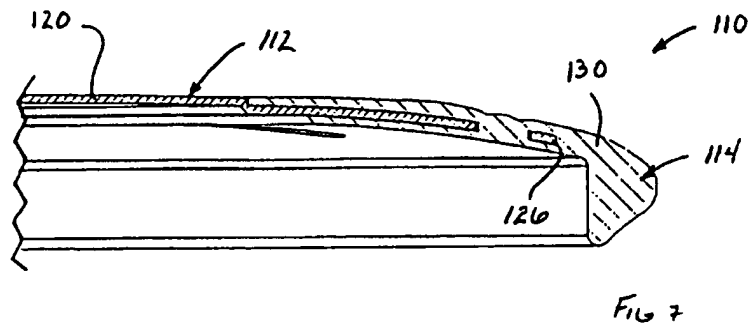
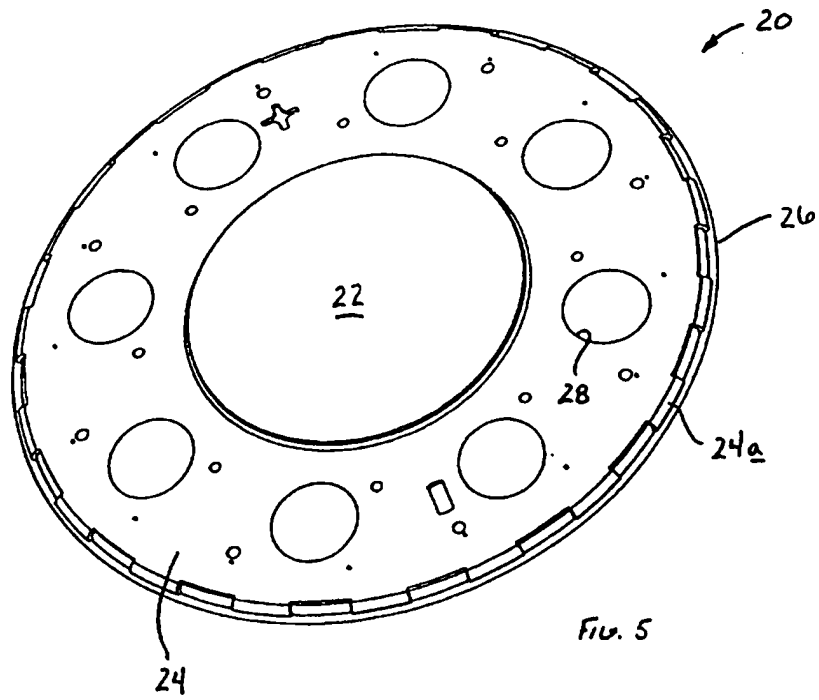


FIG. 4



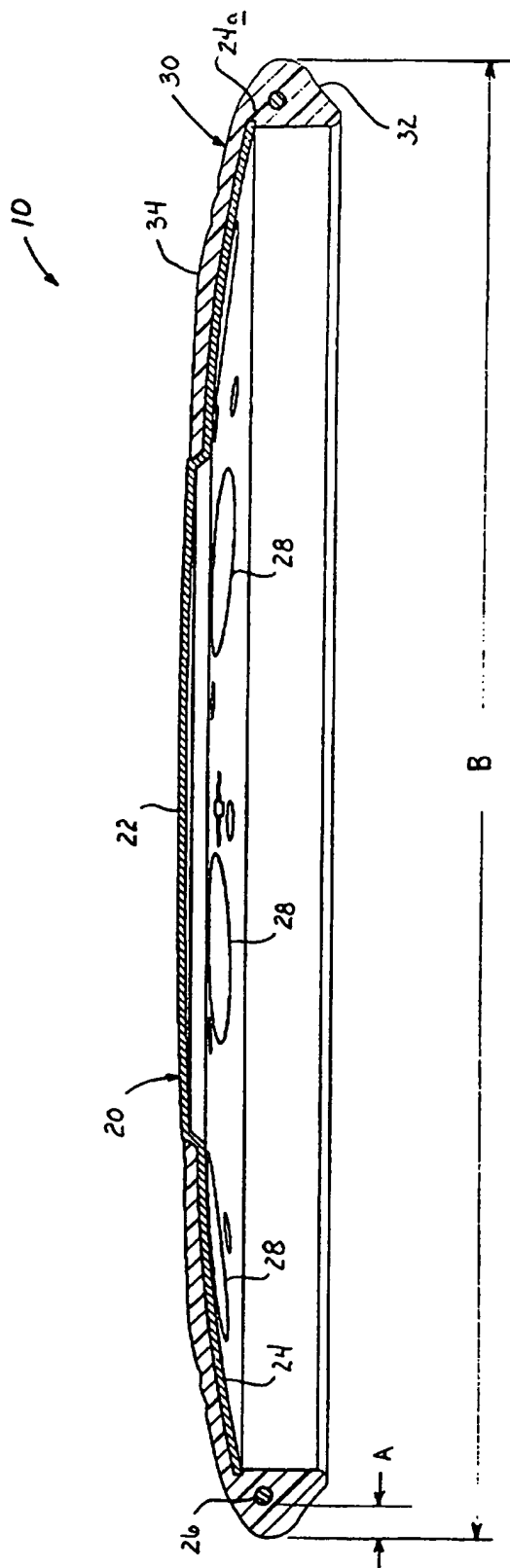


Fig. 6

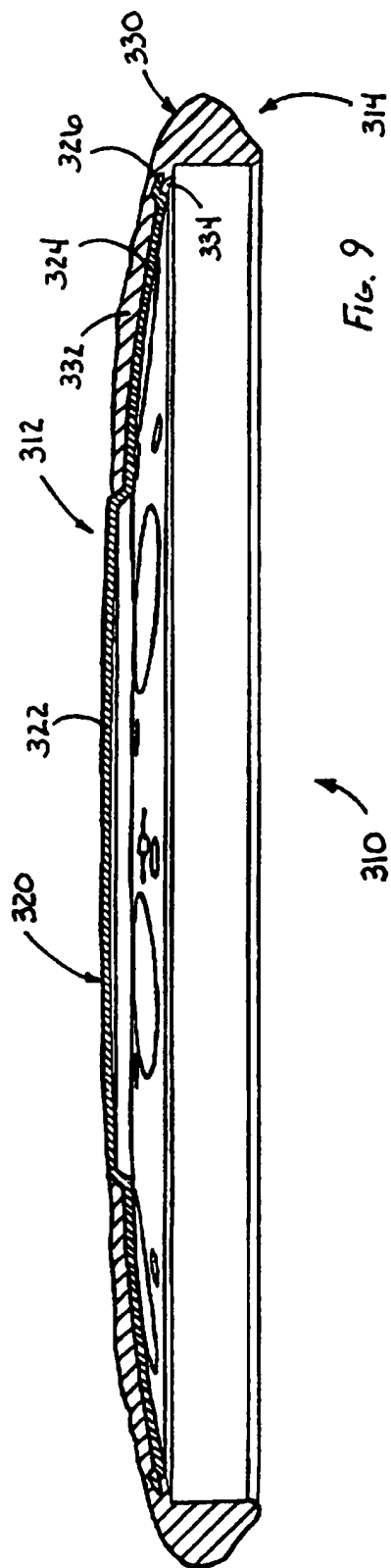


Fig. 9

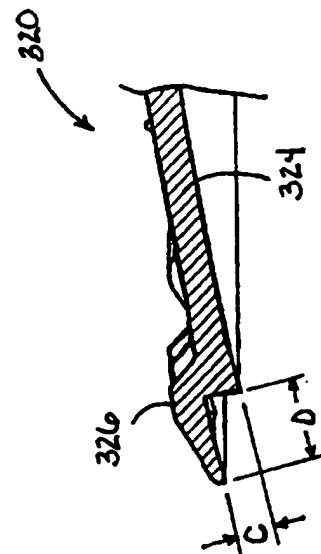


Fig. 9A

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US97/12939

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) :A63H 27/00

US CL :446/48

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 446/48

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
446/46, 47, 219, 236; 473/588, 589

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,366,403 A (WEISS) 22 November 1994, entire document	1, 5, 6
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Y		2, 3, 7-25
Y	US 3,720,018 A (PETERSON et al.) 13 March 1973, Figs 3 and 4; and col 4, lines 1-14	2-4, 7, 8, 10-25
Y	US 4,334,385 A (MELIN et al.) 15 Januaray 1982, Fig 2a.	7, 11
Y	US 2,659,178 A (VAN HARTESVELDT) 17 November 1953, Figs. 1-3.	4, 15, 19
Y	US 4,737,128 A (MOORMANN et al.) 12 April 1988, claim 2.	8, 12, 18, 20

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search

29 AUGUST 1997

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International application No.  
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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,484,159 A (DEAN et al.) 16 January 1996, Figs. 1 and 2.	17
Y	US 5,195,916 A (HER) 23 March 1993, Figs. 3 and 3A.	21-25
Y	US 5,145,439 A (WAGENER) 08 September 1992, figures, and Abstract.	22